FD-GL



Hydrostatic Level Measurement in Shipping and Offshore Applications

Features

/ Capacitive ceramic measuring cell / 4. . .20 mA output / 2-wire technology / Materials 1.4404 or CuNiFe / Excellent linearity / Negligible temperature errors / High long-term stability / Option: Pt100 for standard version

Description:

Hydrostatic level sensors measure the hydrostatic pressure of the fluid column that is present above the sensor and therefore the liquid level. A flush-mounted ceramic measuring cell at the bottom of a stainless steel or CuNiFe housing picks up this pressure in such manner that, out of this, the internal electronic element can generate a 4...20 mA signal that is proportional to the level. The installation costs for the suspension at the self-supporting cable and the reliable 2-wire technology design are kept perceivably low. The FD-GL level sensor meets the standard requirements of Lloyds's Register, the Germanischer Lloyd (German Lloyd) and of DNV (Det Norske Veritas), ABS and CCS. The device can optonally also be supplied with ATEX approval or integrated temperature measurement via PT100 in 3-wire-technology.

Application:

The FD-GL hydrostatic level probe has been developed for deployment in shipping and offshore industries. Thanks to its robust and reliable capacitive ceramic measuring cell and the optionally available sea-water resistant CuNiFe housing, the probe is well-suited for using it in ballast tanks. In addition, in the shipping industry it can be deployed, among other things, in fuel and oil tanks as well as in utility and sewage tanks. The built-in electronic element is triple encapsulated in order to prevent condensate entering into the electronic elements through the ventilation hose. The FD-GL hydrostatic level probe can be supplied as suspension type probe, srew-in probe or as flange probe with fixing flange as per DIN DN25 to DN80.







Hydrostatic Level Measurement



Features

/ 4...20 mA or 0...10 VDC output / 2- or 3-wire technology / ATEX approval for zone 0 and 20 / Ceramic sensor element / High accuracy

/ Connections stainless steel or PVDF

Description:

The FD-03 series of hydrostatic level sensors processes the static pressure of a fluid by means of a capacitive ceramic sensor element. It is designed with front-alignment and hence avoids nearly all faults due to sediments which is particularly important in the wastewater sector. The measuring transmitter is integrated into the probe and emits, at factory-set operating range, a 4. . .20 mA output signal based on the 2-wire system or a 3-wire 0. . .10 VDC output signal.

Application:

The pressure probes FD-03 have been developed for deployment in harsh industrial conditions. They have been extremely efficient especially in the management of sewage plants for obtaining levels in tanks and vessels. The devices are selectable for all DIN ranges up to 200 m water column. Special operating ranges are available on request. The process connection is constructed intentionally in the large surface 1 ½"-male version. Optionally, other connection types can also be supplied. Even when used in hostile media such as acids and alkalis, FD-03 were able to yield excellent results due to the consistency of the process connection made of stainless steel or PVDF and the capacitive ceramic sensor element made of 96% AL_2O_3 or the even higher resistant 99% AL_2O_3 .





Electrical Specifications:

Output signal /	420 mA, 2-wire or 010 VDC, 3-wire	Accuracy /	standard: ≤ ± 0.35% FSO				
Supply /	for 420 mA output: 932 VDC, for Ex-Version: 1428 VDC for 010 VDC output: 12,532 VDC		option: ≤ ± 0.25% FSO just for operating ranges ≥ 0.6 bar (acc. to IEC 60770 - limit point adjustment (non-linearity,				
Permissible load /	420 mA, 2-wire: R _{max} = [(U _B - U _{Bmin}) / 0,02A] Ω 010 VDC, 3-wire: R _{min} = 10 kΩ	Thermal effects (offset and span) / Tolerance band	hysteresis, repeatability)) ≤ ± 0.1% FSO				
Current consumption /	for 420 mA max. 21 mA for 010 VDC max. 5 mA	in compensated range	-20+80°C -40+100°C				
Influence effects /		Temperature of	-40+85°C				
Supply:	0.05% FSO / 10 V	electronics/environment /					
Load: Long term stability /	0.05% FSO / kΩ ≤ + 0,1% FSO / year at reference cond.	Media temperature /	-40+125°C (PVDF -30+125°C) -20+60°C Ex-version Zone 0,				
Turn-on time /	700 ms		-25+70°C Ex-version ≥ Zone 1				
mean Response time:	< 200 ms	Materials /					
max. Response time:	380 ms	Housing:	st. steel 1.4404 or PVDF				
mean Measuring rate:	5/s	Pressure port:	st. steel 1.4404 or PVDF				
Electrical protection /		Diaphragm:	standard: ceramic Al ₂ O ₃ 96% option: ceramic Al ₂ O ₃ 99,9%				
Short-circuit prot.:	permanent	Seals:	FKM (-40+125°C)				
	Emitted interference and interference		EPDM (-40+125°C)				
EMC:	immunity EN 61326	Wetted parts /	seals, diaphragm, pressure port				
Option Ex-protection	Zone 0: ATEX II 1G Ex ia IIC T4 Ga	Weight /	approx. 200 g				
SS process connection /	Zone 20: ATEX II 1D Ex ia IIIC T 85°C Da	Mounting position /	any				
Option Ex-protection	Zone 0/1: ATEX II 1/2G Ex ia IIC T4 Ga/Gb	Operational life /	> 100 x 10 ⁶ loading cycles				
P VDF connection /	Zone 20/21:	Vibration /	10 g RMS (202000 Hz) acc. to DIN FN 60068-2-6				
	for >60 mbar and <10 bar item 17 of the type examination certificate must be attended!	Schock /	100 g / 1 ms acc. to DIN EN 60068-2-27				
Safety rel. technical maximum values /	U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 14 nF, L _i = 0 μH, C _{gnd} = 27 nF						
max. Media-temp. in Ex-Zone /	Zone 0 (-20 +60°C) for p _{atm.} 0,81,1 bar from Zone 1 (-25 +70°C)						
Connecting cables (from manufacture) /	capacitance signal line/shield as well as signal line/signal line 160 pF/m inductance signal line/shield as well as signal line/signal line 1 mikroH/m						
CE-conformity /	EMC guideline 2014/30/EU						
Protection class /	IP65 - IP68 (depending on the el.						

Technical Specifications:

connection, see ordering codes)





Operating ranges and Overload															
Nom. pressure [bar rel.]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Height of fluid [mH ₂ O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
max. pressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
perm. vacuum [bar]	-0).2	-().3		-().5					-1.0			

Dimensions in mm:

Versions:

Process connection st. steel G 1½" flush (DIN 3852) Process connection PVDF¹⁾ G 1½" flush (DIN 3852)

Ø 35

Ø 60

Gasket



¹⁾ not possible in combination with field housing

Wiring Diagram:

2-wire system (current)



3-wire system (current / voltage)



Ordering Codes:

Order-no.	FD-03.	0.	1.	4.	1.	1.	2.	1.	1.	1
FD-03 Hydrostatic Level Measureme	nt									
Operating range / 0a = 0.4 m water colu 0b = 0.6 m water colu 0 = 1.0 m water colu 1a = 1.6 m water colu 1a = 1.6 m water colu 2 = 4.0 m water colu 3 = 6.0 m water colu 4 = 10 m water colu 5a = 25 m water colur 5a = 25 m water colur 7 = 40 m water colur 8 = 60 m water colur 9 = 100 m water colur	Imn, overload 2 Imn, overload 2 Imn, overload 4 Imn, overload 4 Imn, overload 6 Imn, overload 6 Imn, overload 8 Imn, overload 15 Inn, overload 25 Inn, overload 35 Inn, overload 35 Inn, overload 35 Inn, overload 35	bar bar bar bar bar bar bar bar bar bar								
11 = 200 m water colur Gaskets / 1 = FKM (-40+125°C) 3 = EPDM (-40+125°C) 4 = FFKM (-15+125°C) Process connectio	nn, overload 45	bar]							
99 = special connection Ex-approval / 0 = none 1 = ATEX-approval (onl	y for 420 mA	/ in de	vire)	text]					
El. connection / 1 = field housing, stainl 4 = plug connector ISO 5 = Binder series 723 (IF 6 = M12 x 1, 4-pin (IP67) 8 = cable outlet (IP68) 9 = cable outlet with v	less steel 1.4404 4400 (IP65) 267)) entilation tube	(IP67	7)			L				
Output signal / 1 = 420 mA, 2-wire 2 = 010 VDC, 3-wire							L			
Diaphragm / 1 = ceramics Al ₂ O ₃ 96% 2 = ceramics Al ₂ O ₃ 99.9	%							L		
Accuracy / $1 = \le \pm 0.35 \%$ FSO $2 = \le \pm 0.25 \%$ FSO (onl	y for pressure r	anges	; ≥ 0.6	bar)					I	
Material of proces 1 = stainless steel 1.440 2 = PVC (on request)	s connectio	n /								I





Wiring table:

Electrical connections	ISO 4400	Binder 723 (5-pin)	M12 x 1 (4-pin)	Field housing	Cable colours (IEC 60757)
Supply +	1	3	1	IN +	white (wh)
Supply -	2	4	2	IN -	brown (bn)
Signal + (only for 3-wire)	3	1	3	OUT	green (gn)
Shield	ground 🔔	5	4	(<u> </u>	green/yellow (gnye)

Electrical Connection (mm):



